



# COMPUTER WEEKLY

## CDC in plans for revitalising city centres

FURTHER enhancing its image as the concerned computer company, Control Data has formed a new \$3 million company, City Venture Corp, which will plan and manage programmes aimed at providing employment and revitalising depressed inner-city areas.

City Venture, in which Control Data will have the largest shareholding, arises out of a desire to disseminate more widely the expertise that Control Data has gained in ventures established in the depressed parts of Washington DC, Minneapolis, St Paul as well as the depressed rural area of Compton, Kentucky.

Projects are initially being considered in Minneapolis, St Paul, Philadelphia, Atlanta, Detroit, Baltimore, St Louis, Chicago and Flint, Michigan.

The key drive will be to provide employment in depressed inner-city areas and Control Data has consistently concerned itself with all aspects of the social environment rather than simply opening plants and waiting for employees to show up. The Plato computer-based education and training system operated by Control Data will be used.

Control Data opened its first plant in an inner city area a decade ago, to make disc

and tape controllers and core chassis. The plant is on the north side of Minneapolis and has consistently been a top performer in manufacturing efficiency and quality. It has a child-care centre to look after employees' infants, pre-school children and school-age children before and after school hours, enabling heads of one-parent families to work at the plant.

Two projects have also been initiated to assist Native Americans (Red Indians). One involves medical care in the large Rosebud Sioux reservation in South Dakota, and the other is a data preparation plant in northern Manitoba, Canada.

## Infotechnology now vital to Third World

INFORMATION technology is now seen as a vital ingredient in the growth of Third World countries and the whole subject of the role of informatics in developing countries "will never again be treated in the casual way that it has in the past."

That is the view of Ray Atkinson, the leader of the UK delegation to the Spin Inter-governmental Conference on

Strategies and Policies for Informatics held in Torremolinos last week.

Atkinson, who is soon to take responsibility at the Department of Industry for its computers and electronics activities, told Computer Weekly that the whole delegation had been encouraged by what they had seen and heard.

The fact that the conference brought together so many representatives, including several government ministers, for such a long time, gives the subject a significance it has never had before.

The UK initiative offering training facilities to foreign governments (CW, September 7) was well-received. "We got a number of inquiries, and we will be developing contacts over the next few weeks," said Atkinson.

Although observers from

South West African Peoples' Organisation (Swapo) and Palestine Liberation Organisation were present, Atkinson said: "There were hardly any polemics and no political issues. The conference was noteworthy for the responsible way it tackled the subject."

The UK turned out to be the only country to send a mixed delegation, with representatives from industry as well as government. "All the other delegations



Atkinson

### GINO chosen

THE Computer Aided Design Centre's GINO graphics system has been acquired by Fokker-VFW in the Netherlands, and by both the Swedish and Danish Highway Authorities. The hardware will be used as a DECsystem-10, a Univac 1100/11, and a Burroughs 8700 respectively. Installation of the software in Holland and Sweden was undertaken by Applied Graphics Systems bv, of The Hague.

**Modecomp plant**  
A FACTORY that should be manufacturing the majority of systems sold by Modecomp in Europe within the next two years is to be opened by the company at Wokingham, Berkshire, at the end of this year.

### Mexican mission shows way

CIA International marketing sub-committee, chaired by Donald Moore

"We would like to help the Mexican government to develop the framework within which they can educate and develop the staff they need," said Moore. "A wide range of government departments and not-for-profit industries, notably energy," Moore is particularly impressed by the support given to the CSA Initiative from the Department of Industry and the Foreign Office.

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# DOWNTIME

by G. C. G.

## Mother Goose automated

YOU may have read the story about the television censor device, which prevents children from watching TV programmes their parents think unsuitable (CW, August 3). Its New York inventor, Ray Dobson, was talking of bringing it to the UK, thinking there is a big market for it here.

I thought longingly that

may be there were a few hopelessly old-fashioned parents left here who expected to be able to tell their children what programmes they may watch, and be obeyed.

However, a friend of mine had an idea about the machine. When no authorised programme is running, instead of just showing a blank screen it should display a message "Now parents TALK to your children". (My friend wants a royalty for the idea, Mr Dobson.)

Talking of talking to children,



## Spaghetti unravelled

One way of telling that you have a good grasp of a foreign language is when you find you can understand jokes in that language. The French computer news-paper "Zéro Un" has a cartoonist, "Zéva", whose strip on the back page is consistently ingenious. I reproduce here a sample — see if you can work it out. I confess it took me some time. I will print my translation elsewhere in *Downtime* — I'm fairly sure it is correct.

### Technical fault

If you read Paul Samet's article last week on Professionalism, you may have thought he was being surprisingly harsh towards British universities in saying that none of them dealt with technology until 1970. Let me reassure the professor's enraged colleagues by explaining it was a printer's gremlyn at CW that converted an 8 into a 9; it was 1870 that Samet intended to say. We may be backward in Britain but not all that much!

The poor men might well have starved by now, since that is

where we left them. The argument presented by Professor Dijkstra demonstrates that each philosopher would eventually get fed provided only that no philosopher dined at the same time as his neighbour.

### Kamikaze

IT was touching, was it not, that when the transatlantic balloonists ran out of ballast, they had to throw their navigational computer overboard to keep aloft and complete their historic journey. It's nice to feel that our machines are so dispensable.

It would have been much more poignant, of course, if the computer had decided on its own initiative to sacrifice itself for the sake of its human masters, and jettisoned itself automatically. After all, why should't computers be as faithful and lovable as dogs?

ZEVAR cartoon: Puns in foreign languages are always the trickiest jokes to decipher. "Armure" is "armoire", and "deweare" is "deware". Our hero's children would rather clean up their wardrobe, do their homework, than listen to his exposition on the jargon of mysterious jargon.

valent to a 3032.

Like Fujitsu with OSIV/F4, Hitachi is working on its own version of IBM's MVS large-scale operating system, which will have additional features to support a unique scientific option offered with the M-200H.

This is an integrated array processor which is claimed to process complex scientific calculations four times faster than would be possible with the conventional IBM 370 architecture used in the M-200H.

The M-200H is rated at between 7.5 and 9 million instructions per second, compared with 8 to 8.5 for the M-200 and 4 to 4.5 for the 3033.

The specifications of the M-200H indicate that it is considerably more powerful than Fujitsu's M-200, which itself leaves the IBM 3033 way behind. It is the first time that Hitachi has offered an M-series larger than the biggest Fujitsu offering: Hitachi's previous biggest machine was the M-180, equi-

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Like the 3033 and M-200, the M-200H supports up to 16 channels per CPU, with an aggregate transfer rate of 26 Megabytes per second, the same as IBM's 3033, but faster than the 20 Megabytes per second of the M-200.

This means we have to take a much broader view of management than Griffiths does, and broader than we in the DPM do. We in the DPM believe we have a responsibility to help to train people to manage quite large units, to train them also to manage themselves and the job, even when they actually have no responsibility for management services, so he it.

To this extent, therefore, I understand and sympathise with the proposal by Roger Griffiths (CW, August 7) to change the criterion by which members of the British Computer Society are judged. His proposal that "proven ability to handle managerial responsibility" should be the qualification by which the BCS membership would acquire more significance and status is appealing, but has little hope of being accepted because it would be at the stroke of a pen.

It seems to me that our ability to face these challenges relates very much to this open-ended argument, which continually rages in the pages of the journals as well as at various meetings up and down the country, about whether or not we are in a profession and if so, whether that makes us into professionals.

Because of the inevitability of the merging of text, graphics and data technologies, it becomes essential for us to blur these distinctions and to manage along application lines.

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# GILB'S MYTHODOLOGY

## Modularisation: unsung database technique



PROFESSIONAL conferences and publications are jammed with database technology. It sells well, in spite of this there are a number of fundamental techniques for database organisation which are virtually absent from the discussion.

This is surprising since they have been practised in many installations for many years, and they have impressive sets of attributes which can compete, in many cases, with the best claims of the database packages.

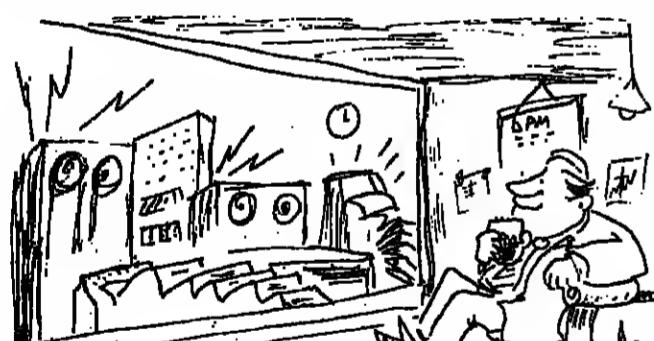
The only reason I can find for the suppression of discussion is that these techniques could not be "sold" as an expensive package to you.

The technique which I want to expose in this column is called (by me, because I can't find it in the literature under any name) database modularisation. It is direct competitor with the concepts of IMS, Total, System 2000, Codasyl-based packages, and all the rest of them.

It combines the fundamental database concept of centralised control and updating, with the currently popular concept of distribution. It will work on any computer which can use secondary files, and there is no rental charge.

Database modularisation, as its name implies, simply an application of the time honoured modularisation principle but, applied this time to file data as opposed to program logic.

In a nutshell the principle is



"...the master is not online to the working environment and not subject to destruction in complex and hectic environments" ...

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### SOFTWARE FILE-1

## 'Open' moves to strengthen Basic

THE Open University is working on the definition of a greatly enhanced version of Basic, which it hopes to use in future computing studies courses.

Key areas in which the language is to be strengthened include facilities control structure, data structure, string handling and file processing.

The new language, work on which has been underway for about six months, is likely to be 100% compatible of the master databases may reside permanently or temporarily in any varied set of computers.

Pseudo updates may be performed locally, and kept online in a change file for reference until they are collected into a periodic update procedure against the master. Protection of the master is conventional, by the keeping of previous generations and changes.

Working files are protected mainly by getting a new extraction from the master, but, if they are small working sets, then local duplication may be more relevant.

Notice in this highly modularised environment the following principles apply. The master is not online to the working environment and not subject to destruction in complex and hectic environments.

In particular master data which is not relevant to the working environment cannot be destroyed, or accessed against security requirements in any way. It is not physically available.

Physical separation is much better than logical separation currently practised in most database management software. The performance optimisation problem is simply the case when a very high percentage of the master records would be substantially updated in a very short time period.

My "score card" is that I make use of the method in at least half of the database design I get involved. The other half are often artificially constrained by prejudice for the one big database approach, and I don't always find it fruitful to take on IBM's marketing effort of each turning.

I'm not saying that modularisation is always best. But it is effective enough to be seriously considered in most applications.

### PROGRAMMER NOTES

characteristic of Basic as indispensable", the paper notes.

The language however had also to allow and encourage the writing of modular and structured programs, and programs which could manipulate data in a natural way.

"Our examination of existing languages showed that although there were a number which satisfied many of our criteria, each and every one had disadvantages. The main crux lay in our conviction that some of the features of Basic were too valuable to be discarded.

The tuning of any working database cannot affect the master or any other working database. Thus any master or working database can be suboptimised for local performance.

The total work capacity of the set of all database thus tuned, will often clearly exceed the performance of a single central master which is also physically the working set of data.

I have noted, mainly as a result of applying modularisation to practical designs for years, the following areas where superior design attributes can be expected compared to "conventional" database design.

Portability, back-up, recovery, performance optimisation, overhead costs, file compaction, program portability, reliability, security, project development time control. You can modularise sub-projects without having the whole database and overheads working.

There are, of course, a number of attributes which in some situations will not effectively compete with a more physically centralised approach. These are mainly the case when a very high percentage of the master records would be substantially updated in a very short time period.

My "score card" is that I make use of the method in at least half of the database design I get involved. The other half are often artificially constrained by prejudice for the one big database approach, and I don't always find it fruitful to take on IBM's marketing effort of each turning.

I'm not saying that modularisation is always best. But it is effective enough to be seriously considered in most applications.

### Detecting syntax errors as text is processed

A METHOD of implementing an intelligent editor, capable of detecting syntax errors in the text being processed, was described at the ICCC Colloquium last week by a researcher from Cambridge.

Aimed in part at speeding up the software development cycle,

### SOFTWARE FILE -2

## Two key features spearhead 2200

POWERFUL software development facilities and a carefully-considered software environment are key features of Wang's 2200 VS system (CW, June 22) which was launched in the UK this week.

Including compilers for Cobol, Basic, and RPG II in addition to a macro-assembler, the system prompts the user at each stage using a hierarchy of menus. Even a non-programmer could in this way create simple menu-driven data-entry programs.

One attractive feature of the file management system is that file placing is handled automatically, as is file size. When a file becomes full, it is extended dynamically by the system.

Another utility, Control and Report, provides facilities for updating, examining, and listing file contents based on a dictionary of data item names.

A major feature of the system throughout is that the user can be guided through any operation by a series of prompting screens. This mechanism operates by default, only coming into operation if the system has been given insufficient data.

Although not offering a DBMS, the system goes some way to meeting such application needs with a powerful indexed-sequential file mechanism. The other major control structure is LOOP. Terminated by an ENDLOOP on a subsequent line, the construction equates to a DO and can be used.

Arising from this, specific requirements for the language include line-by-line syntax checking and the trapping of as many errors as possible as soon as a line has been typed. Much of the power of the system comes from an unusually

This course, which will replace the two existing introductory courses, is expected to place a greater emphasis on commercial software.

The existing courses are algorithmic approach to code putting and Computing and Computers - have been running since 1973 and show signs of further development towards scientific programming and computer science, according to the page

This course, which will replace the two existing introductory courses, is expected to place a greater emphasis on commercial software.

The company is also developing software to emulate the Texas TMS 9900, Motorola M6800, and Intel 8080.

Peter Hills, a director of the firm, pointed out that the approach allows microprocessor application programs to be developed and tested in a fully-supported environment. In addition to the facilities of the host machine, the package provides a variety of features for the user to trace, dump, and debug routines.

The package also provides a microprocessor development which is capable of serving many users simultaneously, he noted. A typical PDP-11 system running under RSTS could easily support 10 concurrent users.

Software emulators are notoriously slow and Altair's software is no exception. Hills observed that the packages exhibited a reduction in execution time of between 10 to 1 and 40 to 1.

For this reason, it is not generally practicable to assemble programs on the host, using the native microprocessor assembler. Instead, cross-compilers are used to generate object code suitable for the target machine.

The report concluded that, although the 150 people involved in research and development are not involved directly in revenue producing activities, the investment in this activity is an "economically efficient one" because it enhances the group's technological capability as well as being beneficial great benefit to the individuals.

Of those, 170 were on paid holiday, 60 were away for reasons such as sickness and union activities and 140 were undergoing training, working on contracts that are not being serviced by the company - perhaps because of an overrun on a fixed price contract - or simply waiting to be assigned to a project.

The other 180 were involved in research and development.

The implementation of the system is based on Augmented

sophisticated range of utilities. One of these, Ez-format - pronounced with an American "z" - can be used to produce a source program automatically in a specified language.

John Pearce



John Pearce

## Insac 'happy to have Logica as a member'

IT was made clear this week that Logica is very likely to join the government's software concern, Insac, when its deal involving the National Enterprise Board and its previous backer, Planning Research Corporation, has been completed (CW, July 6).

Although there have been no formal negotiations, John Pearce, chairman of Insac, said that Logica had expressed an interest in joining and that Insac would be happy to have the company as a member.

There has been a very favourable reaction to our announcement and, although we had a very good relationship with PRC, we are pleased to be free of our "mid-Atlantic" image."

Taylor went on to say that PRC's sale of its holding, which followed an approach by Logica, will be accompanied by major changes in the structure of the holding company, Logica Group, which are yet to be settled.

Thus although Logica staff holdings of the "learning" shares are to be more than doubled, from 25% to 51%, prospective shareholders are unlikely to be called upon to produce large cash sums.

Logica has up till now paid no dividend on these shares but this is unlikely to have worried PRC which has undoubtedly realised a substantial gain since its original investment in 1969.

The sale of its 75% holding of this stock for around £4.2 million gives a nominal value of £5.6 million to the complete equity.

"In the past, we have had preliminary discussions with a

### Host emulation of target micro instruction set

A MICROPROCESSOR development system adopting the unusual approach of software simulation has been produced by a systems and software company based in Wokingham, Berks. The company, Altibros (Engineers) Ltd, has so far produced simulators for the Intel 1601 and Plessey Miproc.

The software, which is written in Fortran, enables the host

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but for which they have insufficient systems and programming capacity.

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- 3. Organisations that do not wish to be involved in the complexity of owning and operating a computer but need data to be processed on CMG's own machines.

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WHAT is the next symbol in this left-to-right sequence? See page 61 for solution.

M 2 3 4

5 6 7 8

9 10 11 12

13 14 15 16

17 18 19 20

21 22 23 24

25 26 27 28

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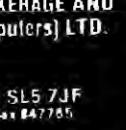
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## PEOPLE



### Suddenly It's Simple

"INCONSISTENT, hastily conceived, and over ambitious." With these words London stockbrokers Wood, Mackenzie and Co have roundly condemned the move by the National Enterprise Board to set up a new company to make 64K bit semiconductor memory chips.

The computer consultancy Grand Metropolitan Systems is a division of the Grand Metropolitan Group, Miss. World Ltd. During his 1982 Missy was shown the computer division, which has one of the Intel AS/5s installed in the UK.

Peter Huggins, previous managing director of Richmond Business Electronics, has joined GEC Semiconductors as managing director of the sales and distribution department.

John Heath, previously computer manager of stockbrokers James Capel and Co, has joined Gordon and Gootch Computer Group as a financial systems executive. Michael duBree, formerly of Apeco where he was a sales executive, has joined the Group as a business sales executive.

Michael Leach, previously engineering manager for Aceups with Emerson Electric Industrial Controls, has been appointed engineering manager of uninterrupted power supplies, which includes responsibility for engineering aspects of Aceups designs. Kenneth Hackborn, who previously worked in the assembly and wiring shop, has become manager of the sub-assembly factory.

Dave Holland, managing director of Ogi-Data, has been given the additional responsibility for sales and distribution throughout Europe.

Philippa Parton has joined BASF as a sales executive, responsible for the sale of EOP media in Central and North London and Middlesex.

Gary Bowman, most recently a sales engineer with G and E Bradley, has joined Avel-Lindberg as sales engineer UPS systems.

Chris Warren, previously a sales representative with Olympia Business Machines, has joined the software products sales team of Westinghouse Management Systems in Edgware, Middlesex.

MANAGING director of Heards Computing, Stan Strudwick, was director and general manager of the company from its foundation four years ago until his recent appointment. He has also joined the main board of R. W. Hould and Son, the parent company.

### Officers elected

AT the Annual General Meeting of the Article Number Association UK, Ronald Harris, director of Teaco UK, was elected chairman, succeeding Stanley Moughan, who has retired. The vice-chairman and honorary treasurer, John Prout of Nestlé and David Barrett of Fine Fare, were re-elected.

The Continuous Business Forms Manufacturers Section of the British Printing Industries Federation, at its AGM, re-elected as chairman Clive Brown, managing director of Roffe Print of Falmouth, and elected as vice-chairman Allen King, managing director of Inchbrook Printers of Walton-under-Edge.

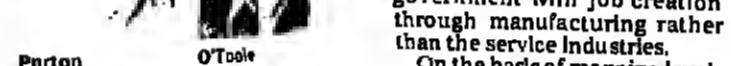
The chairman expressed the Section's regret at the death of previous vice-chairman Jim Richardson of John Dickinson Stationery.

### Giltspur at NEC

THE computer and machinery removing department of Oiltspur Burren Transport Services now controls the company's handling operations at the National Exhibition Centre. Questions relating to handling should be addressed to Bob Thompson, the manager of the department, at Hinckley.



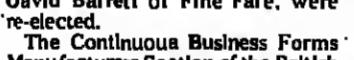
Norton



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### BETA's golf tournament

AT the Business Equipment Trade Association's fifth annual golf tournament, held at the Royal Mid-Surrey course in Richmond, the President's Trophy was won by the team from the Peter Williams Group. The BETA Cup went to the Office Machines and Equipment Federation team, a member of which, Richard Broderick, also won the Rank Xerox Trophy for the best scratch score over 36 holes. In all, there were 98 entrants, and 11 trophies were awarded.

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The chairman expressed the Section's regret at the death of previous vice-chairman Jim Richardson of John Dickinson Stationery.

### As Coleridge will have said in 1817

"POETRY IS THE BEST WORDS IN THE BEST ORDER."

University, London EC1. Register August 18: 01-263 4389, ext 347.

AUGUST 21-25 Cybernetics and systems fourth international congress. World Organisation of Computer Systems and Cybernetics. Amsterdam, Octopus. Or: Rose, College of Technology, Blackburn, tel: 0254 64322.

AUGUST 22-26 Conference on parallel processing. IEEE Computer Society, Wayne State University, Detroit, Michigan, USA.

AUGUST 23-25 Siggraph '78, fifth conference on computer graphics and interactive techniques. Association for Computing Machinery, Atlanta, Georgia, USA.

AUGUST 28-SEPTEMBER 1 Eighth Australian Computer Conference. Australian Computer Society, Canberra.

AUGUST 31-SEPTEMBER 1 Computer data security workshop. Computer Data Security Corp., City

## NEB's 64K Training funds must come from government, says Penney

FUNDS for training new computer staff, thereby relieving the serious manpower shortage in the industry, can only come from central government, according to George Penney, the National Computing Centre's careers manager.

Writing in the NCC's Journal Interface, Penney warns that one of the most successful centrally-funded computer training schemes, Threshold, is in danger of closing next May because it does not fit into the government's new training programme (CW, July 8).

Penney points out many factors pre-

venting people from getting adequate training on the job. He says that small new installations, that are springing up continually, are unable to take on many trainees, if any, while these firms can attract experienced staff away from established organisations, often by offering better opportunities for promotion.

The industry training levies that work quite well in other, more homogeneous industries, could not really work in DP because the majority of computer installations are not in the data processing business, but in engineering, catering,

and so forth.

Employers in these fields were much

more inclined to invest their money in

other entry standard. The other main

source of staff, TOPS, is for mature

students only and will not take school-

leavers.

Penney concludes that the expansion

of the industry is being held up not by

lack of funds or teaching resources, but

a failure of direction in placing the funds

where they are needed. Hopefully, he

says, it will be possible to find another

umbrella under which to operate

Threshold.

It would be foolish, Penney says, for other employers to adopt the "graduate only" entry standard. The other main source of staff, TOPS, is for mature students only and will not take school-leavers.

Penney concludes that the expansion of the industry is being held up not by lack of funds or teaching resources, but a failure of direction in placing the funds where they are needed. Hopefully, he adds, it will be possible to find another umbrella under which to operate Threshold.

## Aiming at top 1,000 companies

THE top 1,000 companies in the UK and government departments, make up the customer base aimed at by Olivetti's data processing products division which is now headed by former Olivetti marketing manager, Phil Clayton (pictured left).

The data processing division sells Olivetti's range of terminals and distributed processing systems as well as its office computer products.



## SPOTLIGHT ON FINANCE FOR INDUSTRY

# ICFC invests £50m in small firms

ALTHOUGH the National Enterprise Board and its Insec software venture have basked in the limelight of publicity for most of the past year, the Industrial and Commercial Finance Corp. also had a record year, investing £50 million in 518 small and medium-scale companies.

ICFC's experience underlines the need for caution. Half of the company start-ups in which it is involved fail, and 6.6% of the money it advances turns into bad debts. It says that offers are made in 75% of cases where a serious approach is made.

In general, the feasibility, viability and prospects for a

company are checked out by one of ICFC's 17 industrial specialists, each of whom is well versed in several market sectors.

ICFC does not go in for hard

selling of its services, but it does

try to make contact with new

companies which might not

otherwise be aware of its

existence, usually by letter.



## We stripped the ICL 1500 and rebuilt it for action

Over the past 18 months ICL have been working to improve the 1500 series, one of the world's most successful series of mini computers, with 8000 sales to its credit.

So far they have been used in singles and in clusters for distributed processing, transaction processing, for data capture and stand alone processing—now the limits are as far as your horizons.

Once again, the ICL 1500 series is right up in front.

**More Power.** The basic 1501-40 model has more power and a more spacious store. Above it are two new models: 1501-41 with a new 5mb disc, and 1501-43 with 2 x 2.5 FEDS. The bigger 1503 is also enhanced and has the capacity to add extra discs drives up to 20mb. And all models have communications facilities.

**ICL 1500 for the communications era.** The significance of these enhancements, together with other hardware and software enhancements (COBOL is now available) is that ICL 1500 now has a powerful interactive capacity.

For example, ICL 1500's linked to a central computer, could take over the menial chore of data validation at the point of transaction. They'd save expensive mainframe time and improve accuracy.

Another example of ICL making a good product even better.

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Limited, ICL House, Putney,  
London SW15 1SW.  
Or telephone 01-788 7272.

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ICL 1500  
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ICL 1500

**OP SPOT****How to add a pseudo-writer**

AN interesting spin-off occurred as the result of an Op Spot hint which explained how to modify the IBM OS pseudo-writer, often known as WTRZ or SCRAPP, to erase output other than class Z (CW, May 18).

I was contacted by a system programmer who asked how he could add a pseudo-writer to his system, an IBM 370/135, running under OS/VSI, Release 5.

I must admit that I was under the impression that the writer was a standard feature of the IBM OS system, but that is obviously not the case.

My immediate reply was this: modify the JCL of a standard writer procedure by replacing the address of a printer with a DUMMY parameter, and add it to SYS1.PROCLIB as the pseudo-writer (Figure 1 is an example of a pseudo-writer).

But the programmer pointed out that the real problem was finding out how to direct the output listings of the readers, writers, initiators and mounts to output class Z.

I got in touch with several experts and finally found someone who knew the solution.

He said, "You have to modify two load modules which exist on SYS1LINKLIB, and are loaded into storage at IPL time.

The modules are called IEEVSTAR and IEEVMINT1, each of which has an \*MSGLEVEL=1 parameter which must be replaced by \*MSGCLASS=Z, in order to route the procedure listings to output class Z.

To do this you must use the IBM SUPERZAP utility, as described in the Service Aids manual."

To understand the reason for this we must consider the following START command and the manner in which the printer the writer will use.

Here we have an example of the JCL of a typical pseudo-writer:

```
//IEPPROG EXEC PGM=IEF08C01,
  PARM='PM'
//IEF08C00 DUMMY,0CB=(RECFM=FM,LRECL=133,BLKSIZE=133)
```

Figure 1

Note the DUMMY parameter which causes the system to erase the output served by the procedure, as opposed to routing it to a printer.

```
//IEPPROG EXEC PGM=IEF08C01,
  PARM='PAIEF08C08,1,88,80,1'
//IEF08C00 DUMMY,0CB=(HN,VERIFY),0CB=(RECFM=FM,LRECL=133)
```

Figure 2



By Bernard Allen

**Sacked GEC men continue their picketing**

WHAT happens at GEC's Stoke, Coventry site now that 16 of the 17 strikers have been sacked by the company?

Firstly, consider the operators themselves, many of whom I spoke to in Coventry on Friday, June 30, immediately after their meeting with Tim Webb of ASTMS, who advised them to return to work.

Despite the fact that the operators were under the threat of dismissal — a threat duly carried out by GEC on Monday, July 3 — all insisted that they were determined to carry on with the dispute. They are continuing to picket.

Brian Hamilton, the telecommunications equipment controller for the operations department and formerly an operator at the site, is the one who decided to return to work.

He explained that he had nothing to gain by staying out. Despite the fact that his position is covered by the closed shop agreement between GEC and ASTMS, the union has no right to bargain on his behalf, so any improved terms the strikers gain will be of no benefit to him.

ASTMS continues to give the operators its full support and has been joined by TASS in this regard, as confirmed by the mass walk-out at the Stoke site on Tuesday, July 4, and the subsequent two-day strike.

TASS became involved in the affair because 100 contract engineers at Stoke, many of whom are TASS members, have been suspended by the company without pay.

What of the company itself?

The spokesman for GEC was reluctant to tell me how the company intends to keep the computer systems at Stoke in operation now that the operators have been dismissed.

Members of the company management, and the systems and programming staff have been providing a user service to the operators' dispute has been on. But how long can they continue?

John Hardie, the GEC shift supervisor who is the operator union representative, told me:

"Although they are not working, twelve-hour shift pattern, as we do, some of them are beginning to look distinctly tired."

The company is likely to be thwarted should it attempt to recruit any new operations staff, because only ASTMS members are allowed to operate the machines, under the agreement with the union.

It may be supposed that the company will at least consider using a bureau service to get the computer work processed.

**HINT OF THE WEEK****Program interrupting**

This week's hint deals with the operator/program interface in the George 2 environment and is sent by Ron Linton, who is computer operations controller at Manchester Polytechnic.

He says, "There are occasions when the operator must interrupt a program, such as when specialist forms are being printed online because of a high volume of output."

Now George 2 does not allow the operator to act directly upon a program, but Ron has a way around this, by using two commands. These are the 'skip to next command' (Go 29), and 'take AT FAIL action' (Go 28).

He continues: "These commands can be used to cause George to effect any required action on the program, although Go 28 should be avoided in case the program should ever genuinely fail."

**Win a prize for your hints**

A £5 PRIZE will be awarded to each person who has a hint published in *Op Spot*. Remember, the hints can be of a technical or non-technical nature.

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# An oral link between machine and man

## LETTERS

To: The Editor, Computer Weekly,  
Dorset House, Stamford Street, London SE1 9LU

IN the preamble to Professor George's article, 'Machine shall talk unto machine' (CW, June 29), it states, "It would be ideal if we could devise a method of verbal communication between machine and man." Surely this was done years ago with the development of the high level languages, which sought to replace strictly coded programming systems with more natural verbal systems.

The article itself is concerned with speech recognition which implies not merely verbal but oral communication, a different problem altogether.

When discussing language it is important to get the words right.

A. TOMLINSON

Congleton,  
Cheshire.

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondents state that their letters may not be cut.

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## 'Academic image' of BCS

MIGHT I be allowed to comment on two points in Op Spot (CW, June 22) about operators and the BCS? The article starts by stating, "The academic image of the British Computer Society is thwarting the operations specialist group in its attempt to attract new members". I have always been at a loss to understand what is meant by the society's so-called academic image. A large number of computer staff in educational establishments are reluctant to join because they believe the society is so totally dominated by the commercial folk!

Too often "academic" is used as a term of abuse, to be equated with "irrelevant". If the complaint is that the society values understanding as well as knowledge and competence, there are no apologies needed on our

part that such qualities are indeed often associated with qualifications.

Secondly, you refer to "the BCS entrance examination". There is no such thing; all with interests in computers and their use are welcome to join. What do we do examinations that lead to professional qualifications. I certainly agree with Barry Palmer in following your part of these examinations although it can be of benefit to operations staff.

In conclusion, let me add how useful a feature Op Spot is, always informative and entertaining as well. Keep up the good work!

PAUL SAMEL  
President

British Computer Society

## Employment—or an improved quality of life?

"LET those who would seek to abolish slavery consider the wealth, the security, the dignity of service, the acquaintance with the arts of civility which such a course would deprive those who are now slaves." Thus I imagine the moral predecessors of those who today fear the advent of a large labour surplus.

The large-scale introduction of micros will undoubtedly cause loss of employment, despite any governmental attempts to create useless work purely for the sake of propping up the employment economy.

Until that economy is abandoned, the inevitable loss of essential employment implies hardship. The essential question which has not entered the discussion as yet is whether employment is a means or an end; why the dole is a poor alternative.

The majority of workers, especially manual, are employed to earn money, not for the fun of

it. If then wealth can be produced without them, the issue lies in a social structure which will pass that wealth on to non-workers. Initially, either the dole will graduate to a national dividend, or the working week may be shortened to a token. If the wealth is not provided, the resultant depression will no doubt end as all others have done, in revolution or war.

The other issue raised, concerning the humiliation of unemployment, is again purely a product of a society geared to use its talents in regular employment. The creative urge—if it indeed exists—has been used in organised labour, but is in no way a desire to become part of an employment machine. Freedom from the necessity to sell oneself, frequently termed prostitution, can imply the freedom to work for one's own satisfaction irrespective of the commercial value attributed to that work.

The dissatisfaction of the present generation of unemployed arises from a society and an education directed away from development of individual

facilities in favour of the employment ethic. Full scale introduction of micro-electronics can make a return in society to personal fulfilment without the need for labour power; in effect, a return to aristocratic society, without the need for a repressed labour class.

However, unlike the traditionally effete aristocrat, modern man has the tradition of practical endeavour. Freedom from directed labour may mean for many not simply leisure but the opportunity to revive traditional arts and crafts which factory employment has all but eliminated. Under present conditions, these crafts are not economically viable, and therefore no longer undertaken seriously. The growing dissatisfaction with the low quality of mass produced goods is timed very well to suit an age when the time for individual craftsmanship may become available.

What is essential in approaching the potential liberation of full automation is the realisation of how society can use the facility, not, as is too often the case, of how the

dom not an imposition.

What must not be allowed to happen is the exclusion of the majority from the wealth created by automation. A parallel may be drawn from late antiquity, in which ownership of the means of production became concentrated in ever fewer hands, reducing the erstwhile middle and lower classes to serfdom, although total wealth was not decreasing.

The micro question ultimately rests not with theorists, nor with lobbies for us against: they are used, and much labour is becoming redundant. It is for ordinary people to ensure that their benefits are shared; it is especially important for the labour unions to determine whether employment or the improved quality of life is the aim, and to foreign dogma achieve practical benefit.

Remember the slaves' freedom without preparation is worse than slavery, but society may envisage a time when slaves can rise if change occurs

I. WHIT

Chichester, Wiltshire.



## COGARVIEW This revolution will not stop with telling the time

memory to take elapsed time readings.

The watch market has gone electronics crazy. The Swiss, whose precision clockworks have dominated watch-making for so many generations, are gnashing their teeth. The customers have deserted them for Texas Instruments, the Japanese, Hong Kong, Taiwan—anyone who can throw together a chip, a LED and LCD and a moulded plastic case. The revolution that micro-miniaturisation has wrought is on, and it will not stop with telling the time.

Today's mainframe makes a stoof of the fast-changing wrist watch scene, but the venture as far as potential venture into the future. For one, vac's resident crystal-gazer, Joseph recently predicted that the 1980s, we'll be wearing wrist-mounted health monitors. His hypochondriac's health would contain sensors to detect the wearer's pulse and skin moisture, assess skin moisture and even detect, in the air, malignant viruses. The theory is that people could be hooked up to the demands they make on the metabolism. In order to combat stress.

But why stop there? Sure, the 1980s alarm mechanism will be so small that they will be incorporated into a wristwatch. A buzz every time the wearer's heart rate approaches a certain level.

"Seriously, though, will function, wrist watch technology sooner or later be realised on any scale."

A little nearer earth is the matchbox-sized pendant transmitter produced by Microjet of

California. It is designed for coronary patients and others who might need urgent medical help at any time. It is a one-ounce transmitter which triggers a receiving unit up to 10 feet away to make a series of pre-programmed telephone calls to summon aid.

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A little nearer earth is the matchbox-sized pendant transmitter produced by Microjet of

## MICRO NEWS

### Industry likely to take up Gatt's CAM

WITH a strong recommendation from the Middlesex Polytechnic research team that the research project which was funded under the Government's Advanced Computer Technology Project should be taken up by industry, Ivor Gatt's Computer Associative Module invention (CW, December 8, 1977) is likely to become an industrial venture.

Though unconfirmed, there are hints that both Plessey and ICL, together with several British radar companies, are interested in developing the invention, which has been proved to be both technically and commercially viable by the Middlesex Poly.

In the CAM invention, a 128K bit serial shift register memory would be constructed on a semiconductor wafer. This would be a self-organising device, capable of bypassing defective circuits on the wafer. It would be used intact, without requiring the costly packaging and testing found with current semiconductor devices.

Used in conjunction with Property 1a, a computer architecture developed by Gatt and currently being funded by ACTP at Brunel University, the CAM invention could be used to create a content-addressable computer system in which much of the data processing is carried out within the memory.

Gatt said last week, "I am pleased to see that there is growing interest in CAM. I am gratified by the initial response, especially from the radar companies, where CAM is well-suited."

In operation, the system will be used to help the racing team perform the vital task of "setting up" the car to suit a particular driver on a particular circuit. Storage of data starts once racing speed has been reached, and a maximum of eight minutes data can be held from the analogue transducers situated round the car.

When testing is finished, the 10 lb microsystem is removed from the car, and selected data called out, either numerically or graphically on a teletypewriter.

The data can be selected on the basis of specific transducers within specific time limits, to give information on the car's actions at various points on the circuit.

The development of the system has been based on the fact that for the majority of applications, the hardware requirements are similar. Bleasdale's system, therefore, uses a modular approach to cover the range of variable requirements normally found.

The range of modules include a variety of I/O systems, such as a parallel I/O board, and an IEEE 488 interface bus module. In addition, one or more slave processors can be added.

Bleasdale will be selling the system configured to meet user's specific requirements.

**£500 buys a Bomp**

UNUSUAL sophistication and a "bargain basement" price characterise the latest microcomputer software package announced by CPU Computers of Woking, Surrey. The company has developed a bill of materials processor which runs on an Intel 8080-based system and costs just £500.

Developed by the firm's subsidiary, Micro Systems Software, the Bomp package is written in Intel 8080 assembly language. It offers a substantial set of processing functions, ranging from the maintenance of assembly and component data to the production of parts lists (explosions) and where-used lists.

A little nearer earth is the matchbox-sized pendant transmitter produced by Microjet of



Standing beside the Arrow Formula One racing car is Ricardo Petrecca who, until the installation of the Silicon microcomputer-based data acquisition system, tested the car's performance by seat of his pants.

### System on-board to test race car

"ALTHOUGH we use similar design rules and the same materials as those used in aircraft manufacture, an aircraft designer would be horrified at the way we test a racing car." This, according to Jackie Oliver, owner of the Arrows motor racing team, was the main reason for a collaborative program with Silicon Micro Systems that aims to put an on-board microcomputer data acquisition system in a racing car for the first time.

Current testing procedure consists of asking the driver how the car "felt" while being driven, and the driver answering on the basis of data acquired from his finger tips and the seat of his pants. The type of data the car designer needs such as accurate measurement of lateral acceleration during cornering, or suspension deflection of individual wheels, can only be guessed at.

In this new venture, Silicon is installing a battery-powered Zilog Z80-based microcomputer system in one of the Arrows racing cars. Equipped with 20K bytes of RAM, which is expandable up to 48K bytes, the system can monitor a total of 16 channels, with a 0.2 second sampling rate.

In operation, the system will be used to help the racing team perform the vital task of "setting up" the car to suit a particular driver on a particular circuit. Storage of data starts once racing speed has been reached, and a maximum of eight minutes data can be held from the analogue transducers situated round the car.

When testing is finished, the 10 lb microsystem is removed from the car, and selected data called out, either numerically or graphically on a teletypewriter.

The data can be selected on the basis of specific transducers within specific time limits, to give information on the car's actions at various points on the circuit.

The development of the system has been based on the fact that for the majority of applications, the hardware requirements are similar. Bleasdale's system, therefore, uses a modular approach to cover the range of variable requirements normally found.

The range of modules include a variety of I/O systems, such as a parallel I/O board, and an IEEE 488 interface bus module. In addition, one or more slave processors can be added.

Bleasdale will be selling the system configured to meet user's specific requirements.

**£500 buys a Bomp**

UNUSUAL sophistication and a "bargain basement" price characterise the latest microcomputer software package announced by CPU Computers of Woking, Surrey. The company has developed a bill of materials processor which runs on an Intel 8080-based system and costs just £500.

Developed by the firm's subsidiary, Micro Systems Software, the Bomp package is written in Intel 8080 assembly language. It offers a substantial set of processing functions, ranging from the maintenance of assembly and component data to the production of parts lists (explosions) and where-used lists.

A little nearer earth is the matchbox-sized pendant transmitter produced by Microjet of

## IBM spends \$25m on Intel memories

ONE of the largest single markets for semiconductor memories seems set to open up, following an agreement between Intel and IBM covering the supply of 2147-type, 4K static RAMs.

Industry observers are now speculating on the possibility that the mainframe giant, itself reckoned to be the largest manufacturer of semiconductor memories in the world, is running into critical memory shortages.

The agreement, about which Intel officials in Sunnyvale declined to comment, is said to cover the supply to IBM of a total of 500 Megabytes of static memory, priced in the range of \$50.00 per Megabyte — a total of \$25 million.

It is being suggested by US observers that Intel's silence on the deal stems from continuing negotiations between the two companies for the supply of 16K bit memory devices.

If these negotiations go

through, it is likely that the part will represent a considerable departure in packaging style for

conventional 16K devices, IBM will expect them in one or two package configurations. Both require that two devices are packaged together to make a 32K bit module. The first is a square package that uses solder bumps instead of leads for connection. The other involves stacking the two devices vertically in an 18 pin package.

The main reason seen for IBM to be forced to outside memory suppliers is that its own 303X memory systems use 2K RAMs, and that its production capacity is already full making these devices. In addition, competition in the mainframe market is forcing IBM to move faster than its previous memory design cycle would allow.

## POWERFUL DIAGNOSTICS

### TEST EQUIPMENT FOR ALL DATA COMMUNICATIONS NEEDS

#### Offer from Bleasdale

CONSULTANT Eddie Bleasdale, who specialises in systems development work on the Motorola 6800 family of microprocessors, has developed his

# Barcelona came up with no easy solutions for the services industry



Over 530 delegates and 180 'accompanying persons' converged on Barcelona for the First World Computing Services Industry Congress. This was the first worldwide jamboree for bureaux and software houses, and was a friendly social occasion. It was sponsored jointly by the European Computing Services Association, the Japanese Software Industry Association, and ADAPSO from the US, with the organisation largely done by Alan Benjamin and the British CSA. Here one of the conference delegates, STEPHEN VALDEZ (pictured left) from Dtnr Sciences International, gives his personal impressions.

"WHERE you going to — Barcelona. Do you have to — yes I do." The words of the number "Barcelona" from Stephen Sondheim's musical Company rang through my mind as the British Airways Trident departed from the British Airways Trident for the First World Computing Services Industry Congress. Some 530 delegates from 26 countries were to meet for the best part of four days to discuss the common problems of the industry.

Making my way with other delegates to the Princess Sofia Hotel, I wondered quite what one expected from such gatherings.

Certainly, there were no easy solutions. The problems of the industry — personnel, software, response to minis, etc — are remarkably similar from Hong

Kong to Japan and Mexico to India. There were no panacea, no shattering truths — just businessmen responding to a challenge in their own way.

The conference divided its time between full plenary sessions and a series of workshops addressing such topics as privacy and security, microcomputers, telecommunications, batch bureaux response to change, etc. Sometimes the choice was difficult as two workshop themes caught one's eye yet both were held at the same time. Unfortunately, the proceedings were not recorded or published in any way so that it was difficult to compensate for sessions that had been missed.

In so far as things were within their control, the organisation was excellent. Coping with 530 delegates and 180 wives is not easy but the central administration was efficient, the hotel coped well and only the software controlling the lifts caused irritation. It was described by an OR man as "Spanish Queuing Theory" and one Japanese delegate, asked how long he'd been waiting, replied, "Three days". Whether this was language diffi-

culty or inscrutable Oriental humour we weren't sure.

It was interesting to contrast this conference with the one ECSA held in Brussels in 1975. On that occasion, there was a degree of uncertainty in the air in the face of minicomputer developments. There was a sort of quasi-religious questing — what must I do to be saved?

Barcelona was altogether more confident with an industry believing it had met the first challenges well and that it was prepared for what was to come. There was near universal acceptance that minis were to be used as an adjunct to the bureau service.

A key controversy which did develop was whether bureaux were right to offer minis as a profit activity in its own right, ie with no bureau processing

attached. Notably, those doing so defended this view vigorously, in at least one case backing up their arguments with very detailed profit and loss accounts. This, I feel, is a theme to which the next conference will return.

The confident mood of the conference may have owed much to a fine opening address by Frank Lautenberg of Automatic Data Processing Inc, which produced a net profit before tax of \$50 million on a turnover of \$300m. He believed that, just as radio had survived the onset of television, so computer service companies would re-adapt and prosper in the face of change.

The keynote, he argued, was service and not technology — the so-called "obsolete" batch processing techniques are both

alive and well. Some of the euphoria induced by this speed may have been dispelled by Al d'Agostino of CAP in an address on the second day. In his view, the industry was complacent in the face of revolutionary change from microprocessors. Mainframe were dead and many service companies would be caught with their trousers down.

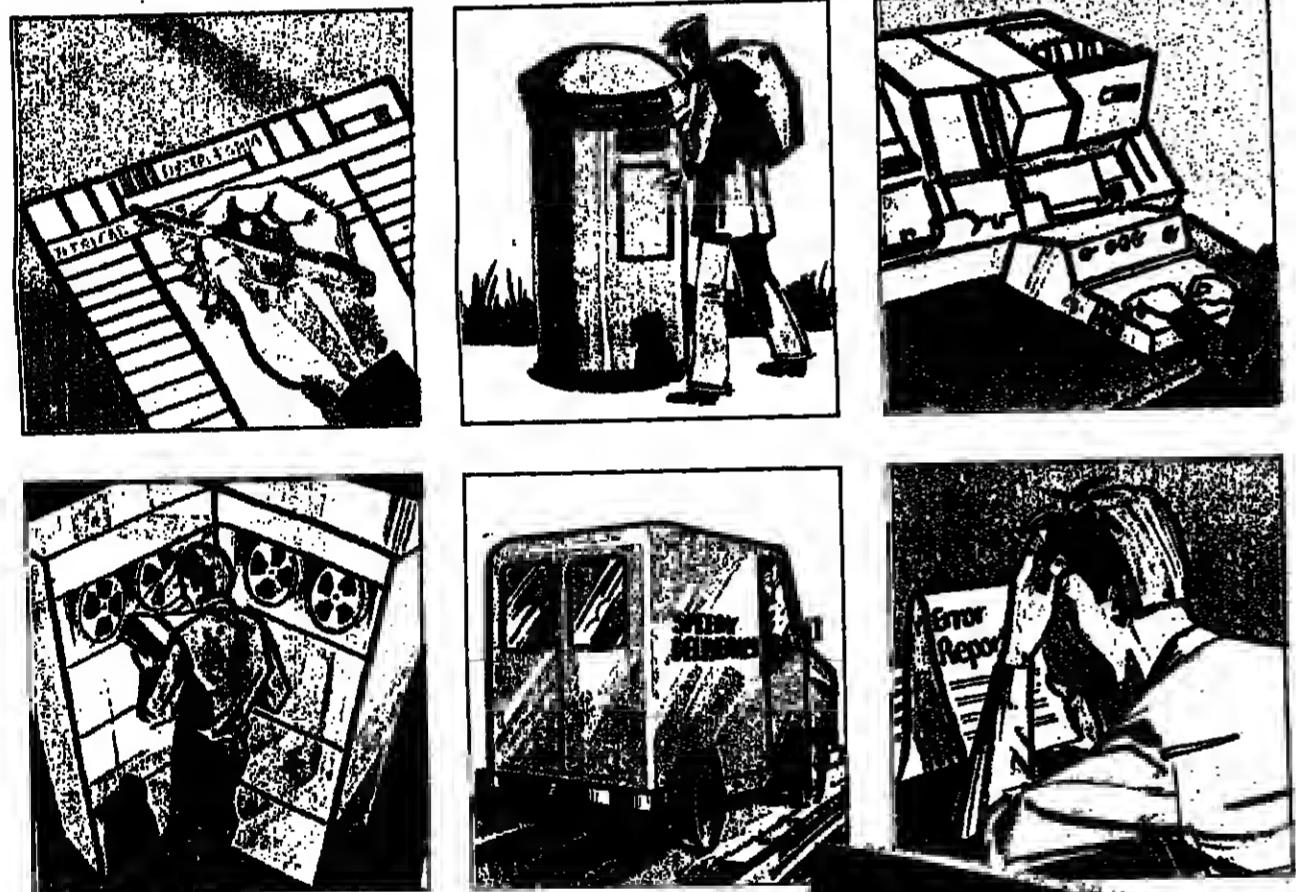
Here were two opposing views — evolution or revolution!

I discussed this issue with Al d'Agostino of CAP in an address on the second day. In his view, the industry was complacent in the face of revolutionary change from microprocessors. Mainframe were dead and many service companies would be caught with their trousers down.

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### SERIES 700

terminal processing systems

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## R-range Facts

### Hardware

|      |   |
|------|---|
| R100 | 8 terminal data entry and distributed data processing system  |
| R300 | 20 terminal data entry and distributed data processing system |
| R400 | 48 terminal data entry and distributed data processing system |
| R550 | 30 terminal mixed media data entry system                     |
| R830 | 2 micro terminal distributed data processing system           |
| R850 | 24 micro terminal distributed data processing system          |

### Software

|                                      | R100 | R300 | R400 | R550 | R830 | RS |
|--------------------------------------|------|------|------|------|------|----|
| Multi-Tasking Operating System       | ●    | ●    | ●    | ●    | ●    | ●  |
| Virtual Memory                       | ●    | ●    | ●    | ●    | ●    | ●  |
| Virtual Terminal Operation           | ●    | ●    | ●    | ●    | ●    | ●  |
| COBOL-like Application Language      | ●    | ●    | ●    | ●    | ●    | ●  |
| Formal Language                      | ●    | ●    | ●    | ●    | ●    | ●  |
| Interactive Program Development      | ●    | ●    | ●    | ●    | ●    | ●  |
| Test Editing                         |      |      |      |      |      |    |
| Systems Log                          | ●    | ●    | ●    | ●    | ●    | ●  |
| Operator Statistics                  | ●    | ●    | ●    | ●    | ●    | ●  |
| Re-entrant Code                      | ●    | ●    | ●    | ●    | ●    | ●  |
| Stack Processing                     | ●    | ●    | ●    | ●    | ●    | ●  |
| Independence of Data & Code          | ●    | ●    | ●    | ●    | ●    | ●  |
| Structured Data Sets                 | ●    | ●    | ●    | ●    | ●    | ●  |
| Multi-level Indices                  | ●    | ●    | ●    | ●    | ●    | ●  |
| Multi-level System Security          | ●    | ●    | ●    | ●    | ●    | ●  |
| Command Sequence                     | ●    | ●    | ●    | ●    | ●    | ●  |
| Data Entry Software                  | ●    | ●    | ●    | ●    | ●    | ●  |
| Distributed Data Processing Software | ●    | ●    | ●    | ●    | ●    | ●  |
| Dynamic Disk Management              | ●    | ●    | ●    | ●    | ●    | ●  |
| Seek Optimisation                    | ●    | ●    | ●    | ●    | ●    | ●  |
| Full Range of Utilities              | ●    | ●    | ●    | ●    | ●    | ●  |

### Data Communications

|                      |   |   |   |   |
|----------------------|---|---|---|---|
| Burroughs TC 3500    | ● | ● | ● | ● |
| Burroughs TD 330     | ● | ● | ● | ● |
| IBM 2780/3780/3741   | ● | ● | ● | ● |
| IBM 3270             |   |   |   |   |
| HSPRJE               |   |   |   |   |
| SDLC                 | ● | ● | ● | ● |
| ICL 7020             | ● | ● | ● | ● |
| ICL 7502/3           | ● | ● | ● | ● |
| ICL 7181             |   |   |   |   |
| Redifon Synchronous  | ● | ● | ● | ● |
| Redifon Asynchronous | ● | ● | ● | ● |
| Unisys 1004          | ● | ● | ● | ● |

## Derbyshire councils vote for 2900s

MORE local government orders for ICL 2900 series machines were announced last week by Derby City Council, which is to take a medium range 2950, and the nearby Amber Valley District Council which is to install a 2904/50.

The confident mood of the conference may have owed much to a fine opening address by Frank Lautenberg of Automatic Data Processing Inc, which produced a net profit before tax of \$50 million on a turnover of \$300m. He believed that, just as radio had survived the onset of television, so computer service companies would re-adapt and prosper in the face of change.

Derby's 2950 is valued at £370,000 and it has 512K of main store, four 10Mbyte disc drives, four 7502 terminal processors, and a 7504 line printer.

Amber Valley's 2904/50 system to be installed at Heanor, is valued at £160,000, and features 48K of main store, three 60Mbyte disc drives, and the National Maritime Institute. Supertankers are so high

out of the water that they catch

the wind more than a clipper, and "sail" in unexpected ways when without power, according to the shape of the superstructure and hull.

Redifon's 2904/50 system

is to be installed at Buxton.

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Red

# Nora Report — an example of open government for the British to follow

ONE of France's most widely discussed and hottest selling books is *Le Rapport Nora*. And deservedly so. It is wide-ranging and long-term in its approach, equally at ease in computer and telecoms technology and their sociological implications, and strikes the perfect balance between conclusions and readability in the main book, and depth of analytical detail in the four annexes and appendices that support its main conclusions.

What is most striking to a British visitor, however, is that a book with all these qualities should be the work not of academics but of a team of civil

servants, drawn interestingly enough from a Study Group on the Information Society within the Ministry of Industry, and has been commissioned by the French President himself.

Even more remarkable is the fact that this official report should have been published for everyone in France to read within four months of being presented to the President — an example of open government one hopes the British government will follow when it receives the report on the long term effect of microprocessors that the Prime Minister has instructed the Central Policy Review Group to prepare.

These technological developments present contemporary society with three challenges.

The French report begins by summarising briefly the main current technological developments in computer and telecommunications technology. Increasingly cheap minicomputers, microprocessors and semiconductor memories, multi-purpose communications satellites, and the rise in service industry and office employment to stall and even reverse it.

But it also emphasises that such personnel economies are the stuff of which increased productivity is made, and that maximum productivity in export and import replacement industries is essential in any economy dependent on foreign trade. French and British societies should therefore look primarily

to non-market professions like teaching, the arts and leisure industries to provide new replacement jobs, and in highly automated export industries only to earn the foreign exchange with which to pay for the expansion of the non-market sector.

The Nora report breaks new ground, however, when it turns to the challenges that *la télématique* will present to existing power structures, and to national independence. The expensive computers of the 1960s favoured administrative centralisation and gave large organisations an advantage. The much cheaper mini and microcomputers of today give smaller organisations an opportunity to catch up. Much depends, however, on the data communications network architecture and control.

Hierarchical network architectures using private lines will continue to be only within the financial reach of large organisations.

To bring the benefits of *la télématique* within the reach of small firms and local authorities, public data networks with standardised interfaces must be provided.

These will frequently be opposed by powerful vested interests, and the Nora report gives some fascinating examples from within France: how the large commercial banks with branches throughout the country are opposing a unified bank network that would give small local banks the same advantage of easy accessibility via the network; how Air France is opposing a unified seat reservation network, accessible to independent travel agents and tour operators; and how a computerised information system at the new Rungis fruit and vegetable market in the Paris region has remained unused because it threatened to undermine the large wholesalers' monopoly on market price information.

**Cheep satellite communications might ultimately impose American cultural patterns on the whole of Europe.**

The Nora report foresees many more conflicts of interest groups, and proposes that the French state should intervene actively as arbiter, preferably on the side of the small and weak. But its ability to do so will depend on the PTT's monopoly on the provision of telecommunications channels remaining effective, and this is currently being challenged by the development of communications satellite technology. These abolish the effective economic cost difference between medium and long distance communications links, and make it no more expensive to communicate across the Atlantic than between one side of Europe and another, or even between one end of France and the other.

Cheap satellite communications might thus aggravate the current tendency for both public interest and private corporate database to be concentrated in the US, on the computers of the better organised American ser-



SET up at the beginning of this year (CW, January 19), Data Recording Equipment Ltd is a wholly-owned subsidiary of the Data Recording Instrument Company and embraces most of the operations of DRI be-

fore it became a holding company. The change in DRI's status was made after it acquired VDU manufacturer Newbury Laboratories. The third DRI subsidiary is magnetic head manufac-

turer Dets Recording Haeda Ltd. Data Recording Instruments is majority owned by the National Enterprises Board, which injected about £2 million into the company two years ago (CW, July 28, 1976).

# DRE challenges the dominance of US suppliers

ONE of the few European original equipment manufacturers of peripherals to challenge the dominance of US-based suppliers is Data Recording Equipment, a firm which likes to think of itself as Europe's "local" OEM.

Exports to European customers outside the UK accounted for about 50% of DRE's £16 million sales in its 1977/78 financial year, which ended March 31, and DRE estimates that the proportion of its output ending up with Continental computer users is nearer 70% if units exported as part of complete systems by UK customers are included.

DRE's greatest strength is in the cartridge disc drive business, where it claims about a third of the European market, making it the biggest OEM supplier in Europe, bigger than any of its US competitors.

And it is also putting a lot of

effort into increasing its share of the markets for its matrix printers, floppy disc drives and fixed disc drives — the latter being seen as a major growth area.

DRE's recently appointed marketing director, Jim Jnnes, says: "In this business you

"At the same time we still manufacture our original three Megabyte Series 30 front loading drive under licence from Diablo, even though the 3200 can hold up to 12 Megabytes on a cartridge. About 50,000 Series 30 units have been sold worldwide by Diablo and DRE and people are still buying it.

"One reason is the extreme conservatism of the computer industry — just think how many people still buy the traditional teletype — and another is that a lot of customers do not want to change the configuration of an existing system. But they should move to the 3200 when they introduce new systems.

"Our 3200 front loading cartridge disc drive was designed by us specifically for European users and with really big customers like ICL we get together and do a lot of 'blue sky thinking' about their future product requirements.

like peculiarities in power supplies and government safety and electrical standards relating to things like radio interference.

"Unlike some US firms, we are prepared to do business with customers wanting small quantities like 10 units a month; and with big customers we can easily bring in people other than salesmen when they need support.

"Our 3200 front loading cartridge disc drive was designed by us specifically for European users and with really big customers like ICL we get together and do a lot of 'blue sky thinking' about their future product requirements.

"One new type of customer for the Series 30 is the micro-computer systems builder wanting something more than a floppy disc drive. We are very interested in the predictions that have been made about the total European market for intelligent systems of one form or another. They put the potential total number of systems at about six million, with about a third of the cost of each system being accounted for by the sort of low cost peripherals that DRE manufactures.

"Another area we are looking at is the peripheral controller business. At the moment the only thing we make along those lines is a formatter for our floppy disc drives.

"The sort of development we are interested in is what could be called a total peripheral solution — a peripheral subsystem that can handle all the different peripherals in a configuration — to offer the customer one-stop peripheral shopping.

"The main problem is to decide which computer produces the subsystem for, because the

modules containing between one and four discs with two read/write heads per recording surface and capacities that range from 12 to 74 Megabytes.

Each drive can also have 0.74 or 2.23 Megabytes of fixed head storage and there are two fixed head only versions with capacities of 2.97 and 5.94 Megabytes.

The 3300 drives are sealed modules containing between one and four discs with two read/write heads per recording surface and capacities that range from 12 to 74 Megabytes.

Each drive can also have 0.74 or 2.23 Megabytes of fixed head storage and there are two fixed

head only versions with capacities of 2.97 and 5.94 Megabytes.

The 3300 drives employ Winchester type technology with light loaded non-retarding heads, Winchester being the code name commonly applied to IBM's fixed module disc storage.

The Series 3300 was developed jointly by DRE and the US peripheral manufacturer, Okidata, which is half owned by Old Electric of Japan. Okidata's disc plant is in California, at Santa Clara just south of San Francisco.

This is in the heart of the area

popularly known as "Silicon Valley" because so many semiconductor manufacturers are based there. It is also a magnetic storage technology hotbed with IBM's magnetic products centre at nearby San Jose and firms like Memorex and Shugart also in the locality.

Not surprising, therefore, that DRE retains a consultant permanently in Santa Clara as well as maintaining a working relationship with Okidata.

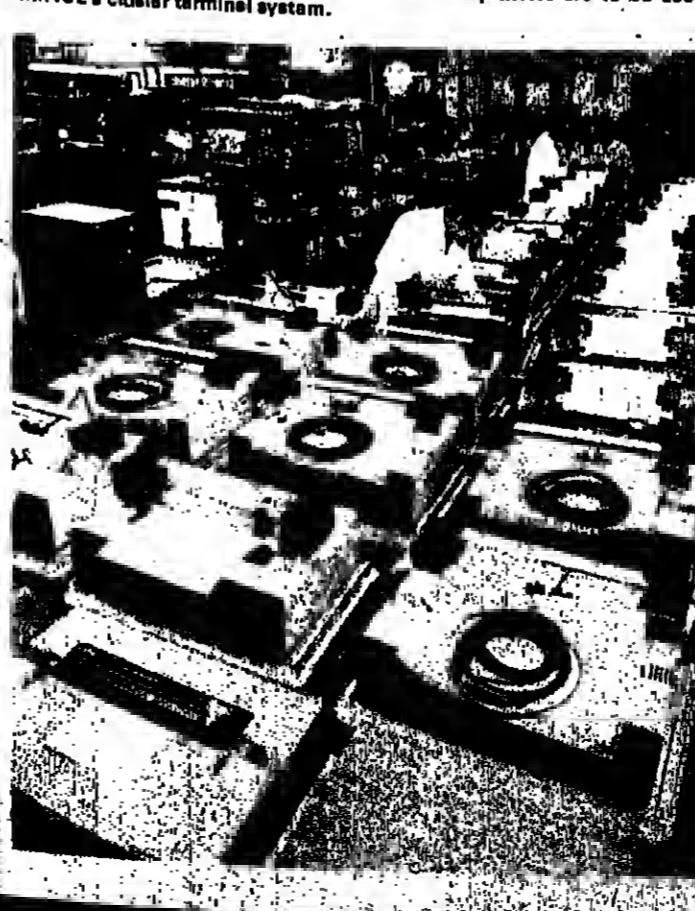
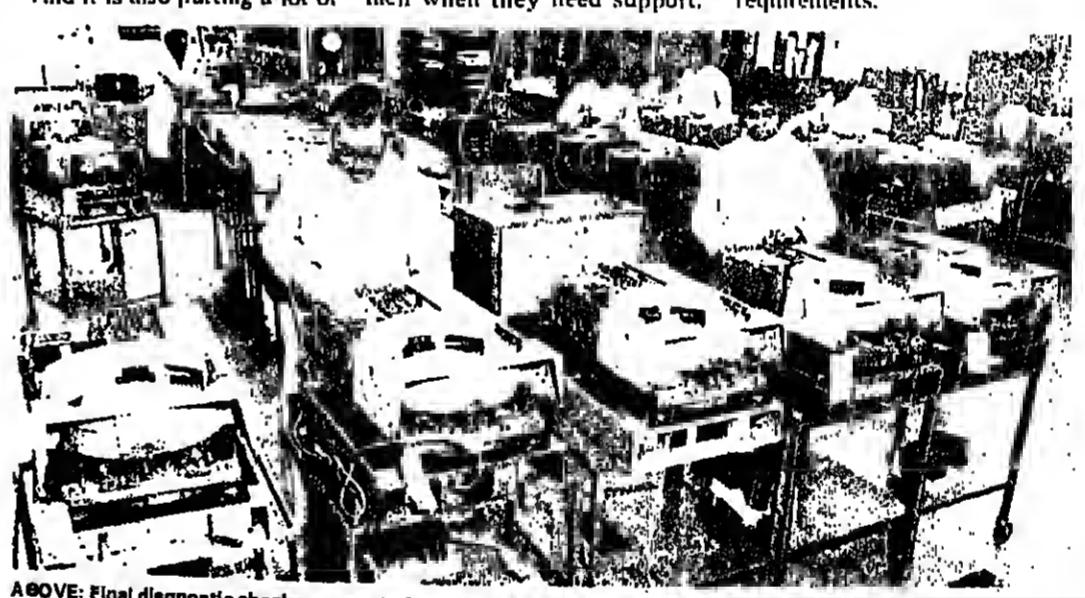
At the moment the relationship is extremely close because Okidata is building the Series 3300 at either of DRE's two major manufacturing locations at Staines and Crewe.

According to DRE's manufacturing director, David Dean, one of the main reasons for this state of affairs was the great difficulty that DRE encountered in finding suitable factory space to build the 3300 at either of DRE's two major manufacturing locations at Staines and Crewe.

Dean added that there were a few suitable buildings in the Staines area but that they got snapped up very quickly while, at Crewe, the problem was a shortage of modern property.

ABOVE: Final diagnostic checks are carried out on DRE 4DDDA disc drives at the firm's main factory at Staines. The 4DDDA has one fixed disc and one removable cartridge disc and can hold up to 12 Megabytes of data.

BELOW: A batch of DRE 632G output matrix printers ready for delivery to ICL, one of DRE's biggest OEM customers. The printers are to be used in ICL's cluster terminal system.



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Valves versus Transistors. Do valve audio amplifiers give better quality sound than transistor amplifiers?

## wireless world

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**Neg £5500**

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Programmers with 1-2 years' OS COBOL, preferably with MVS plus any amount, no matter how small, of analysis experience, have this chance of becoming experienced Analyst/Programmers. An added advantage for applicants would be a knowledge of BOMP plus manufacturing applications.

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AOC 1135

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AOC 1703

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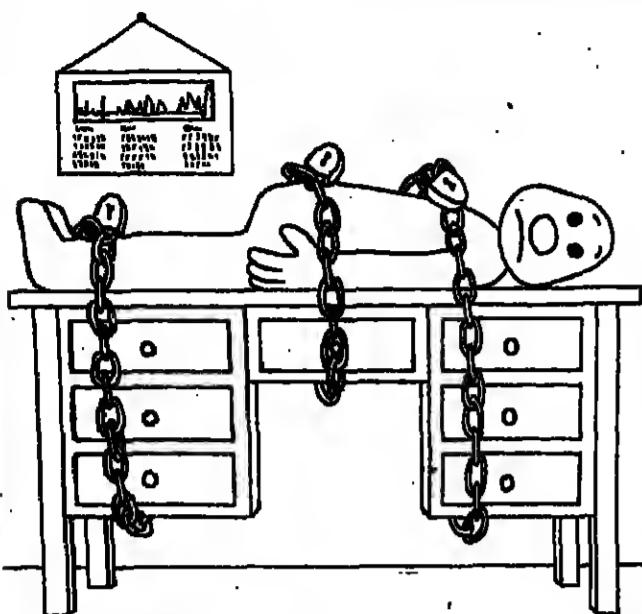
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## MYRIAD

CHAINED TO A DESK ALL DAY?... CONSIDER  
PROGRAMMING CONSULTANCY3-4 years' COBOL  
LONDON & HOME COUNTIES UP TO £6,500

We are seeking a Programmer or Analyst/Programmer keen to accelerate his/her career by a move to Team Leading. You will be expected to play a major role in the development of new systems, being responsible for the programming and implementation of projects from specification to overall testing.

The person appointed will have in-depth knowledge of COBOL with an appreciation of commercial data processing. Previous supervisory experience is not essential although a commitment to maintaining high standards of coding and documentation are required.

The Company, a Systems and Programming Consultancy, offers a professional environment with the exciting prospect of allowing your career and responsibility to grow with the Company.

Ref. W3/1307

MYRIAD APPOINTMENTS LIMITED Computer Personnel-Consultants  
Telephone or write to: 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

Software for  
Avionics Systems  
CHELTENHAM

The Aviation Division of Smiths Industries has a heavy commitment in programmed avionic equipment now essential to the operation of modern high-speed aircraft, both military and civil.

So we are rapidly expanding our software activity to develop a variety of applications employing the most advanced systems technology.

These positions will attract specialists at various levels up to senior, with several years' relevant practical experience and a degree or equivalent in electronics, computer science, mathematics or other related subject. This includes newly-qualified graduates aiming for top-position experience.

You would work with small project teams, have computer access and considerable responsibility for your part of the software.

## Real-time Airborne Software

Here you would design and program airborne mini and micro-computers for cockpit display, weapons guidance and flight control. A high level of job satisfaction through direct contribution to aircraft performance and customer liaison is assured.

## Support Software

backs the equipment activity with the design, production, adaptation and maintenance of compilers, assemblers, interpreters and design/analysis/documentation tools for airborne computer programming—including the support of a growing range of micro-processors.

We offer attractive starting salaries, plus the full range of benefits customary in a major international organisation—including relocation assistance to this pleasing area of the Cotswolds.

If you are seeking advancement in a growth activity write to:

H. Upson, Assistant Personnel Manager,  
SMITHS INDUSTRIES LIMITED

## AVIATION DIVISION

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Freelance  
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Contracts in LANCS and YORKS.

Honeywell 86.

Top rates.

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Tel: 0742 25069

The Royal Borough of  
KENSINGTON AND  
CHELSEA  
CONTROL  
CLERK  
Up to £3450 p.a. inc.

An enthusiastic person required to join our Computer Operations Department. Experience in COBOL, FORTRAN and BASIC is required. Minimum of six months' computer experience preferred, probably gained on data processing, 35-hour week, 21 days' holiday, 25 days' annual leave and London and social clubs. Please ring Tel: 01-481 4884. 277 for further information.

TRAINEE SALES  
for someone with  
OPERATIONS/R. Experience. London or  
Manchester based.  
Telephone  
01-528 7667

**SOUTH WEST UNIVERSITIES  
REGIONAL COMPUTER  
CENTRE  
UNIVERSITY OF BATH**

**ICL 2980  
OPERATING**

The Regional Centre operates a large 2980 system on VME/B, providing computer services to Universities in the South West via powerful communications facilities.

Applications are invited for the post of

## SENIOR OPERATOR

The post offers excellent opportunities for career advancement with ICL new range. Candidates must possess initiative, technical ability, plus an attitude approach to operating.

Salary £6,212-C3446 + 2 Shift Allowance of £371 (and review).

Application forms and further particulars (quoting Ref. 78/148) from Personnel Officer, University of Bath, Clarendon Road, Bath BA2 7AY. Closing date 17th July, 1978.

## REQUIRED

**MINI COMPUTER PROGRAMMER**  
with one to three years' experience in Fortran and/or Assembly language, preferably on Data General equipment.

Position will require specialised training in Oilfield related work and will be U.K. based, with 15-25% international travel.

Applications in writing only to

Mr. C. R. Hecker, Manager Computer Services  
Sperry-Sun International Inc.  
Steam Mill, Great Yarmouth, Norfolk NR31 0HP

UNITED KINGDOM ATOMIC ENERGY AUTHORITY  
NORTHERN DIVISIONCOMPUTER  
PROGRAMMER

A requirement for a Computer Programmer has arisen in the Computer Section at Wylfa Nuclear Power Development Laboratories, Cumbria. The Section will shortly be losing its computing services on an ICL 2980 supporting both RJE and Teletype terminals and this post will provide an opportunity for the selected applicant to acquire experience in Systems Analysis and in the writing of data bank software.

## QUALIFICATIONS AND EXPERIENCE

Applicants (male or female) must possess a Higher National Certificate or Diploma in a scientific, engineering or mathematical subject, or an equivalent qualification. The languages used are COBOL and FORTRAN; familiarity with ICL or IBM operating systems is desirable but not essential.

## TERMS OF APPOINTMENT

Appointment will be to the Scientific Officer grade with salary within the range £3,037 to £4,724 per annum.

Excellent service conditions include 20 days' annual holidays and other benefits appropriate to a staff appointment.

For application form, please write (no stamp required) to:

Staff Officer  
United Kingdom Atomic Energy Authority  
Northern Division  
FREEPOST, Rileay, Warrington WA3 1BR  
quoting Ref. No. S1032A/J170.  
Closing date 28 July, 1978

Make your future with **UKAEA**

THE UNIVERSITY OF LEEPS  
COMPUTER  
OPERATOR

Applications are invited for the post of Computer Operator or Senior Computer Operator. In the administrative data processing section of the University, the post is a staff position within a shift system involving day and evening shifts and requires an operator with experience of an ICL 1802A (solid disc) or similar machine.

Salary will be on the scale £3,317 to £3,688 or £3,805 £3,434 (both scales inclusive of £100 per annum shift allowance). A shift allowance of £280 a year is payable. Attractive conditions of service including pension scheme, sick pay scheme and generous leave entitlement.

Written applications stating age, experience and previous employment should be sent to Mr. M. M. Smith, Senior Assistant Registrar (Data Processing Services), University of Leeds, LS2 9JT.

GRADUATE  
PROGRAMMER

Consulting Engineers have a vacancy for a Graduate Programmer with a degree in Mathematics or Computer Science and about two years' post-graduate experience. He/she will work on the development of our suite for the design of large-scale systems to be applied in Transportation Planning, Statistics, Project Management and accounting, Highway and Structural design. Salary will be dependent on experience.

Please send brief details of qualifications and experience to: P. R. Bennett, Brian Colquhoun and Partners, 22 Upper Grosvenor Street, London W1X 8AP. Tel: 01-481 4884.

TRAINEE SALES  
for someone with  
OPERATIONS/R. Experience. London or  
Manchester based.  
Telephone  
01-528 7667

Manager  
Military Software Section

GEC Computers Limited's continuing expansion in the Military and Defence fields, has an Engineering Group to seek a suitable candidate for the above post.

Reporting directly to the Manager of the Military and Peripheral Development Department, the successful applicant will be required to set up the section by recruitment of the appropriate personnel and will be responsible for its continued operation and development. In addition the man or woman appointed will be involved in discussions with military or defence customers, representatives on projects which have, or could have, a software content.

A degree or equivalent in a relevant discipline is required, together with a minimum of 5 years experience in the software field—preferably with a knowledge of COBOL. Experience with military customers would be an asset but is not essential.

Please telephone Graham Ince on Luton (0582) 417552 or him at P.E.R., 58 Park Street, Luton, Beds.

Applications from B.C.H. in the last week of July.

## SUSSEX

| SYSTEMS ANALYSTS    | several yrs exp. in Prod. systs.      | £7,000 |
|---------------------|---------------------------------------|--------|
| SYSTEMS ANALYSTS    | 2 yrs exp. Financial systs.           | £6,700 |
| ANALYST PROGRAMMER  | 2 yrs COBOL + some analysis           | £6,500 |
| SEN ANALYST/PROG    | Real Time + FORTRAN + BASIC           | neg    |
| SYSTEMS PROGRAMMER  | over 2 yrs exp. generation on IBM 370 | neg    |
| ANALYST PROGRAMMERS | prl PL/I/RPG II                       | £3,000 |
| TRAINEE PROGRAMMERS | Maths/Avionics Graduates              | neg    |

Applications are invited for the post of

## HERTS

| PROJECT LEADER    | design, devl & implementation | £3,500  |
|-------------------|-------------------------------|---------|
| PROGRAMMERS       | 2 yrs COBOL or ASSEMBLER      | £25,000 |
| SEN SYST ANALYSTS | micro system implementation   | neg     |
| SYSTEMS ANALYST   | ASSEMBLY lang. on Micro Frame | neg     |
| ANALYSTS          | comm background prof.         | neg     |
| PROGRAMMERS       | communications                | neg     |
| PROGRAMMERS       | 12 bit IBM OS/VS POWER/VS     | neg     |
| PROGRAMMERS       | POWER/VS                      | neg     |

For further details and an application form please phone or call in.

**AMES PERSONNEL**  
Employment Agency, Suite 14, Oryden Chambers, 119, Oxford Street, London W1P 1PA. Tel: 01-434 1106

OPERATIONS  
SUPERVISOR

S. HARROW c. £5,000.

Pioneer, an expanding Multi-national company with interests in ready-mix concrete, quarrying and asphalt are installing a Honeywell 62/50 128k Disk/Tape computer and require an experienced Operations Supervisor to join our O.P. Team.

Previous operating experience is essential. A knowledge of Honeywell Level 62 G COS and JCL would be an advantage.

The position involves supervision of operations and ancillary staff, job scheduling and control of operations procedures.

Benefits include a competitive salary and contributory staff pension scheme.

**PIONEER**  
Contact: Roger Merquet on (01) 864 8611, or write to: U.K. Systems Manager, Pioneer Concrete (Holdings) Ltd., 58-60 Northolt Road, South Harrow, Middx.

For further details telephone 01-580 6222. Application by letter to Central Computing Section, Birbeck College, Merton Street, WC1.

## HALTON BOROUGH COUNCIL

## CHIEF FINANCE OFFICER'S DEPARTMENT

## COMPUTER SECTION

An Order has been recently placed for an ICL 2904 with Osca, Magnetic Tapes and ODE's to replace the present ICL 1901 installation and is due to be commissioned in the Autumn. It is envisaged that future developments will cover a wide range of applications including on-line systems.

SENIOR ANALYST/  
PROGRAMMER

Grade AP5/BS01 £4,773-£5,888

Applications are invited for the above posts from persons with several years' systems experience using Discs and Tapes and a programming background which includes COBOL. The successful applicant must be able to take charge of a system from investigation to implementation and be capable of negotiating with user departments. A knowledge of ICL 2903 job control language and direct data entry equipment is desirable but not essential.

## ANALYST/PROGRAMMER

Grade AP3/BS01 £3,732-£5,073

Applicants must have at least 2 years' COBOL programming experience using Discs and Tapes and a minimum of 1 year's systems analyst work.

The above posts are based in Widnes, and a system of flexible working hours is in operation.

The Council will be willing to pay in an appropriate case reasonable removal expenses and make available accommodation to the successful applicant.

Applications in writing, giving details of age, qualifications, experience, together with the names and addresses of two referees, should be forwarded to the Head of Personnel and Management Services, Halton Borough Council, Municipal Building, Kingway, Widnes, Cheshire, WA8 7GF. Closing date 21st July, 1978.

R. Turton  
Chief Executive

Solve  
Real Time Mini's  
language problem  
for up to £10k p.a.!

It's on the cards. We've got mini-computer makers and users and software houses with every conceivable configuration offering us the Moon for people with the languages in shortest supply:

Macro 11, RTLIL, Coral,  
Assembler-level languages,  
all high-level languages.

Quite modest experience on top of one of those could put you up in the 8-figure salary class.

And experience of operating system RSX11M as well would probably well clinch it for you.

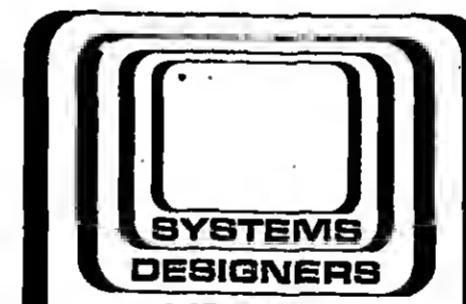
As for micro languages, absolutely anything's marvellous. But if you have Intel 8080 or 8085, you have it made like Paul Newman used to.

Particular applications right now:

Micro processing, word processing, process control, message switching, flight simulation, radar systems, automated telex systems, communications, diagnostic programming, video typing systems, composition and typesetting.

Ring up Beryl McLaren on 01-836 9719 or 9882. And just speak your language.

**Jupiter** Computer Appointments  
(Real Time Mini's Place)  
Suite 43, 12-13 Henrietta Street,  
London WC2

PROGRAMMERS  
SYSTEMS ENGINEERS  
CONSULTANTS to £9,000

## INFORMAL INTERVIEWS

CAFE ROYAL, REGENT STREET  
TUESDAY, 18TH JULY

It's a challenging career in an expanding top consultancy, where you will be working with a variety of computers. In many applications, a drink and a chat with our managers and consultants. We are at the Cafe Royal, Regent Street, on Tuesday, 18th July, from 12 noon until 8 p.m. where we shall be pleased to discuss your career prospects within our Company.

If you cannot make it, telephone Bill Hockey on Camberley (0276) 83471 or write to him at:

**SYSTEMS DESIGNERS LIMITED**  
Systems House  
57-61 High Street  
Frimley, Camberley  
Surrey GU18 5HU

Applications are invited for the above posts.

## Basic Systems

Design of both new languages and compilers, consistency, and development of micro based products.

## Real Time Systems

Predominantly defence and involves the application of advanced techniques to engineering or mathematical problems.

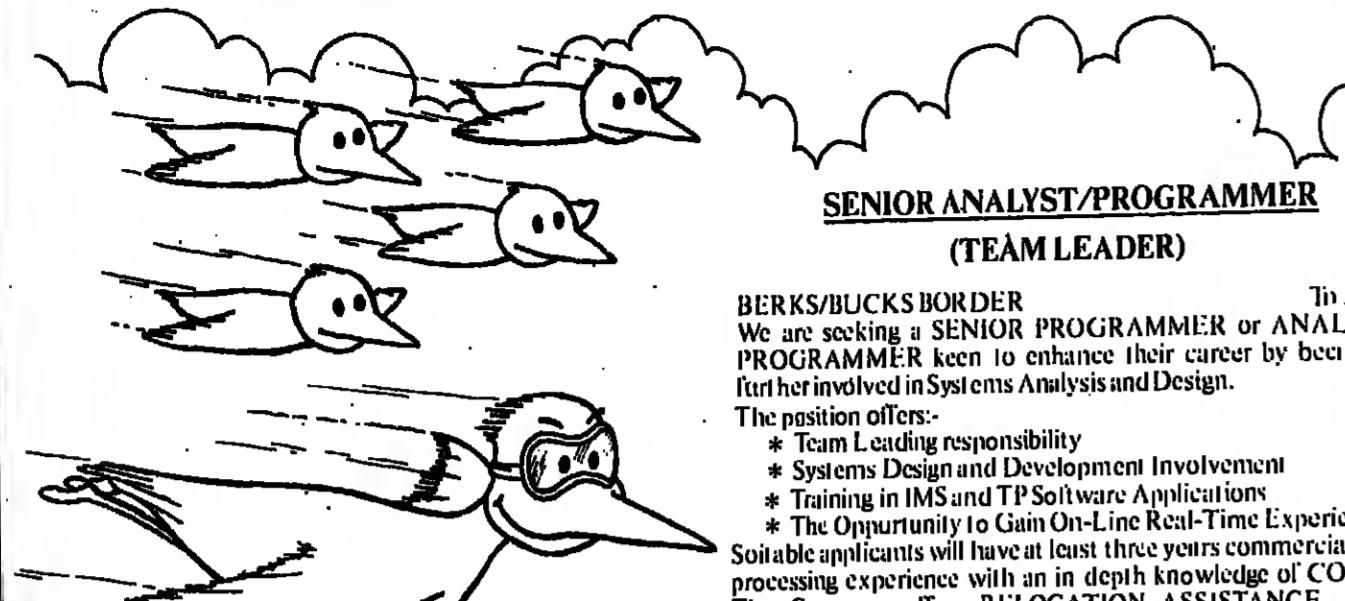
## Communications

Working in the field of Message Switching, Military, Civil, Cloud, Switching and Auto-Talk Switching, mini and micro based systems.

## Industrial&lt;/div

## MYRIAD

## A CHANCE FOR YOU TO LEAD THE WAY!

SENIOR ANALYST/PROGRAMMER  
(TEAM LEADER)

BERKS/BUCKS BORDER To £65K  
We are seeking a SENIOR PROGRAMMER or ANALYST/PROGRAMMER keen to enhance their career by becoming further involved in Systems Analysis and Design.

The position offers:

- \* Team Leading responsibility
- \* Systems Design and Development Involvement
- \* Training in IMS and TP Software Applications
- \* The Opportunity to Gain On-Line Real-Time Experience

Suitable applicants will have at least three years commercial data processing experience with an in depth knowledge of COBOL. The Company offers RELOCATION ASSISTANCE, FIVE WEEKS HOLIDAY and an excellent starting salary.

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants  
Telephone or write to: 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)



CONTROL DATA, producer of the world's largest computers and leader in providing total computer services throughout the world has immediate openings of its Cybernet Centre Europe in Brussels for

Systems Software Analyst  
Trainee Software Analyst

Candidates should have experience in maintenance of operating systems software for large scale computer systems and in a high level language.

CONTROL DATA is expanding its CALL 370 time-sharing service which is run on Control Data IBM compatible mainframes and has openings for

## Applications Analyst

for Customer Services

Candidates should have experience with maintenance of applications packages in a time-sharing environment. Experience on IBM machines is desirable but not essential.

## Systems Engineer

Candidates should have experience in assembler plus OS/VS or MVS for maintenance of operating systems software on medium scale IBM 370 systems.

For all openings, English is essential and knowledge of French or Dutch desirable. The company offers to successful applicants good working conditions as well as an attractive package of compensation plus legal and extra legal benefits.

Please send detailed c.v. to:

Control Data

Cybernet Europe Inc.  
Attn.: Personnel Department,  
Raketeistraat 50a rue de la Fusée,  
1130 Brussels

CONTROL DATA  
CYBERNET EUROPE INC.  
the challenges of tomorrow today

## FREELANCERS

Have you good experience of  
ICL 2950

CICS or TASKMASTER  
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MINI ASSEMBLER (COMMUNICATIONS)

RING JIM TAYLOR ON:  
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If you have sound  
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will give you full sales  
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Phone D.D. Linthead  
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01-489 6306

PROGRAMMERS  
ANALYSTS  
PROJECT LEADERS

£4,500-£8,500

A branch of the largest supplier of DEC mini-computers in Europe require experienced computer staff to design and implement commercial systems using on-line techniques on DEC hardware. A knowledge of RSTS, BASIC, DIBOL, COBOL and SQUASH is desirable. Don't let your knowledge of other machines prevent you learning something new. Our offices are in Thame, Oxfordshire, which gives easy access to London and the South East when most of our projects are concentrated. Other benefits include: Contributory pension scheme, travel expenses and discretionary bonus scheme. For more information and application form please write to Gamma Business Systems, 27 High Street, Thame, Oxfordshire, OX9 1AA, or ring Tony Simpson, 01-398 7235 (daytime) or 01-489 7493 (evening).

Telephone or write to: 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

University of Bristol  
Applications are invited for the post of

TEACHING ASSISTANT  
IN COMPUTER SCIENCE

within the Department of Mathematics from 1st October, 1978. The successful candidate will provide assistance with the various computing courses provided for undergraduates including some program advisory work and the writing of programs for use in teaching within the Department.

Applicants should have an Honours degree preferably in Computer Science, and also programming experience in both a high-level language and assembler.

The salary for the appointment will be £3,188-£4,601 p.a. or £3,880-£5,282 p.a. the initial placing depending on age, qualifications and experience. Applicants with a relevant Ph.D. can expect to be appointed on the higher scale.

Further particulars may be obtained from The Secretary, University of Bristol, Senate House, Bristol BS8 1TH, to whom applications should be sent by 28th July, 1978.

SYSTEMS ANALYSTS  
PROGRAMMERS OPERATORS  
Regular or with a company who want to work for you!

Ring:  
YIP CONSULTANTS  
INTERNATIONAL  
(01-481 3220)  
Don't sit on the fence!

SALES £12K+  
SUPPORT £8K+

Computer Automation is the world leader in minicomputer technology and the Naked Mini Division requires additional staff based from the European Headquarters in Hertfordshire.

Sales professionals who have a proven track record and management potential are required to sell our expanding range of OEM minicomputers in all parts of the country.

Support consultants who have experience of pre/post sales situations are required to cover the whole spectrum of systems support from hardware configuration to operating systems and language compilers e.g. Assembler, BASIC, COBOL, FORTRAN.

Benefits for these career opportunities include Company Car, Pension scheme, Life Assurance and Private Medical Insurance.

Please send CV or telephone Niel Clements on Rickmansworth 71211 or write to:

Computer Automation  
CAI Limited (Computer Automation)  
Hertford House, Denham Way,  
Rickmansworth,  
Hertfordshire WD13 2XD.

MYRIAD  
APPOINTMENTS  
LIMITED

Computer Personnel Consultants

## NEW SYSTEMS

PROGRAMMERS £4,600  
ANALYST/PROGRAMMERS £5,300

Having employed their IBM 370/125 for highly specialised marketing systems covering their range of products, our client, a division of a major British Company, is now about to embark on the development of a complete range of commercial systems. This is an ideal opportunity for keen data processing professionals to become involved in the initial stages of projects and see these to successful implementation. It is expected the first phase will incorporate STOCK RECORDING, SALES AND STATISTICS and LEDGERS and it is envisaged that this will be part of a total Management Information System.

The positions offer the opportunity of joining project teams and becoming actively involved in applications from feasibility study to successful implementation. A sound COBOL or ASSEMBLER background is a prime requirement for success in these roles.

Apart from attractive salaries and prospects, the company also offer very favourable relocation expenses and other fringe benefits.

Ref. No. 1307  
24 hr. answering service  
Please telephone for a confidential discussion or write to:  
30 Fleet Street London EC4Y 1AA

BURROUGHS  
SOFTWARE  
PROGRAMMER

## Woking - £5,225

Due to internal promotion we have an opportunity for a software programmer to take responsibility for and to develop, a wide range of in-house software utilities.

Candidates with Burroughs medium

systems experience should

ideally have a sound

knowledge of COBOL, a

working knowledge of

assembler and have worked

in a data communications

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For an application form please

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Director of Manpower Services

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